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ABSTRACT

The purpose of this study was to determine the effectiveness of remedial courses and present placement policies and instruments. Comparisons were made in such areas as ability, interest, motivation, persistence, and performance among randomly selected groups of junior college students: (1) those needing to take remedial courses but placed in regular courses, (2) those who enrolled in regular courses after passing remedial courses, and (3) those who did not require remediation. The English remedial course had no effect on student satisfaction but produced a small improvement in subsequent performance. The mathematics remedial course eliminated some of the dissatisfaction with the regular course and had a significant effect on subsequent course work. The placement procedures appeared to be more effective in assigning students to appropriate mathematics than to English courses. (Author/CA)

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Abstract

Randomly selected groups of students required to take remedial courses at two community colleges were placed in regular courses on an experimental basis. The experimentally placed students were compared with those who enrolled in a regular course after passing a remedial course and with those who did not require remediation. Comparisons were made on ability, interest, motivation, persistence, and performance. The English remedial course had no effect on student satisfaction but produced a small improvement in subsequent performance. The mathematics remedial course eliminated some of the dissatisfaction with the regular course and had a significant effect on subsequent course work. The placement procedures appeared to be more effective in assigning students to appropriate mathematics than to English courses.

EFFECTIVENESS OF REMEDIATION IN JUNIOR COLLEGE[1]

Amiel T. Sharon

Educational Testing Service

Remedial programs in college are offered to students who are not academically prepared for college-level study--those of low ability or those who lack certain educational experiences. The practice of remediation is especially important in many public junior colleges which have a policy of admitting all students who might profit from instruction.

The goal of remediation, like the goal of education, has been given a variety of meanings and interpretations. Remedial programs are said to prepare students for advanced study, to help students achieve vocational competence, to develop the students' capacities as completely as possible, and to provide low achievers with a general education (Roueche, 1967).

A more specific and immediate purpose of a remedial course might be to eliminate the weaknesses of students entering college in order to improve the chances that they will pass the subsequent regular course in the subject. Thus, the goal of a remedial English course would be to help academically unprepared students pass the regular English course. Defining the objective of a remedial course in this specific manner provides one with a criterion for evaluating it. Another criterion which might be considered is student satisfaction with the course. Does the student feel that the course is appropriate for him or does he feel that he is wasting his time? This criterion could provide a means for evaluating the remedial course from the students' point of view.

Previous research indicates that remedial programs would require much improvement if they are to fulfill their function. Roueche's (1967) review

of 20 studies on remediation concludes that the effect of these programs on students' subsequent educational accomplishments is questionable. More recently, a well designed study by Losak (1969) suggests that academically unprepared students who receive remediation do not perform any better in college than those who do not take remedial courses. Losak found that a remedial English course at one large junior college did not raise the achievement or ability level in subsequent courses or produce fewer withdrawals from college.

It is generally difficult to have control groups in educational research. The notion of "manipulating" the education of students for the sake of research is anathema to many educators. There is an urgent need, however, for control groups by which remedial training can be evaluated because a major problem in evaluating remedial courses is that the students are placed before the evaluation of the courses and placement instruments can occur. For example, if a student is placed in a remedial course, it is impossible to determine how he would have done in the regular course. If he could have taken and passed the regular course, then his placement in a remedial course would have been a mistake which would have wasted his time as well as that of the college. If he had failed the regular course, his placement in the remedial course also would have been a mistake if the remedial course was not effective. If the student were to take the regular course a second time and pass, he would have spent no more time in the regular-regular sequence than in the remedial-regular sequence. Assuming that an equal number of students similar to him pass the second-term regular course in the remedial-regular and regular-regular sequences, the advantage of the latter sequence is that no misplacement of students into remedial courses is possible.

Even if an effective remedial course exists, there is still the problem of selecting and validating the placement instruments. A placement test validated against a regular course or a remedial course will not optimally place students because validation on students who are not representative of the group upon which placement decisions are usually made is subject to systematic bias. In the case where all students take the regular course, a better validation of the selection instruments is possible because the entire range of abilities is represented.

The objectives of this experimental study are to determine:

1. How effective are remedial courses in junior colleges--do they in fact prepare the student for subsequent work?
2. How effective are present placement policies and instruments--do they place students in the highest level course they can successfully complete?

Method

Two Connecticut community colleges (to be called Colleges A and B) placed some of their students, identified by placement tests for remedial instruction, in regular courses on an experimental basis. The students were experimentally placed in required regular English courses at both colleges and in the required regular mathematics course at College B. These students who constituted the control group were selected randomly from all students who were about to be placed in a remedial course. The only exception was that those students who scored so extremely low on the placement tests--those the instructors felt did not have a chance to survive in the regular course--were not considered for selection to the control group. Less than

5 per cent of the students in the English courses and 14 per cent of the students in the mathematics course were thus exempted from experimental placement. The control groups were formed by selecting students through a table of random numbers. The number of students in the control groups was determined by the participating colleges. No attempt was made to equate the number of students in these groups with that of any other group in the study. The instructors teaching the regular courses did not know which students were in a control group; therefore, there was no possibility of bias. Thus, the control groups approximated the situation that might develop if the remedial courses were to be eliminated.

A brief description of all the groups employed in the study follows. The exempted remedial group consisted of students who were placed in the remedial course by the procedures in effect and who were not considered for experimental placement in the regular course because their chances of success were judged too low. Most of these students went on to the regular course in the second term. The regular group consisted of students who were placed in the regular course in accordance with the usual placement procedures. The remedial group consisted of students who were placed in the remedial course in accordance with the usual placement procedures and then went on to the regular course. The control group consisted of students who would have been placed in the remedial course by the usual procedures but who instead were experimentally placed in the regular course and were graded on the same scale as the regular students.

A variety of predictor and criterion data were gathered on the student groups. The predictors included measures of ability, interest, and motivation. Ability was assessed by the Comparative Guidance and Placement (CGP)

Verbal and Mathematics Tests; interest in English and in mathematics by the CGP Comparative Interest Index (CII) in English and in mathematics, respectively; and motivation by the CGP Academic Motivation scale. Detailed descriptions of these scales can be found in the CGP Interpretive Manual (College Entrance Examination Board, 1969).

The criterion measures employed included grades in English or mathematics course, satisfaction with the course, passing the course, and persistence in the course. Satisfaction with mathematics and English courses was assessed by two factor analytically-constructed scales which are described in detail by Modu (1970).

It should be mentioned that data were incomplete on two variables. Only 38 per cent of the students had Academic Motivation scores and only 73 per cent had Satisfaction scores. Almost all students had scores on the other measures described above.

The random selection procedure used to form the remedial and control groups apparently resulted in two groups equivalent in the relevant abilities at College B but not at College A. At College A the mean CGP Verbal test scores for the English remedial and control groups were 43.1 and 46.0, respectively. The corresponding means for the two groups at College B were 47.6 and 47.2. For the mathematics course at College B the mean CGP Mathematics test score for the remedial group was 50.1 and for the control group 47.4. The difference is statistically significant[2] only at College A.

Results

For each of the English study groups at Colleges A and B who had no prior remediation, Tables 1 and 2, respectively, show the number and

percentages of students passing, failing, and withdrawing. Final grades of A, B, C, or D were considered as passing while a grade of F was regarded as failure. Withdrawals included dropouts from the course, dropouts from college, and "incompletes." Also shown in Tables 1 and 2 are the mean grade-point averages (GPA) of those passing the course on a 1 to 4 scale where D = 1 and A = 4, the mean CGP Verbal, English Interest (CII-English), Academic Motivation, and Satisfaction scores. Table 3 provides corresponding information for the mathematics courses at College B. Tables 4 and 5 show the number and percentages of students passing, failing, and withdrawing; the grade-point averages of those passing on a 1 to 4 scale; and the CGP Verbal scores for those students at College B who took the regular English and mathematics courses, respectively, after passing the remedial or exempted remedial courses.

Insert Tables 1-5 about here

Discussion

Effectiveness of Remedial English Courses

One of the most striking results appearing in Tables 1 and 2 is that over two-thirds of those in the control groups managed to pass the regular English course. It is apparent that substantial numbers of students who would ordinarily be placed in a remedial English course are able to pass the regular English course. A second unexpected finding indicated in these tables is that the percentages of students passing in the remedial and control groups at each college are not significantly different. At College A, 65 and 67 per cent of the students in the remedial and control

groups, respectively, passed while the corresponding percentages at College B were 83 and 73 per cent. These results imply that a student selected for remediation has about the same probability of passing a regular English course as a remedial course.

One way in which the effectiveness of the remedial English course at College B was evaluated was by determining whether it prepared students for the subsequent regular course in English. The remedial course of College A, however, was not evaluated in this manner because the regular course grades for remedial students were not available. Figure 1 indicates that of the 130 students who enrolled in the remedial course at College B, 83 per cent or 108 students passed and 83 of these students enrolled in the regular course. There was no significant difference between the Verbal test scores of those who did and those who did not enroll in the regular course after passing the remedial course. This result indicates that the 83 students who enrolled in the regular course after passing the remedial course were representative of all the remedial students except the exempted remedials.

Insert Figure 1 about here

Figure 1 indicates that the students who received remediation were more similar to the regular students than to the control group in their rate of passing, failing, and withdrawing from the regular course. Although the percentage of remedials passing the regular course was somewhat larger than that in the control group, it was not significantly larger (83 vs. 73 per cent; $\underline{Z} = 1.51$). The percentage of students withdrawing from the regular course after remediation was smaller, but not significantly smaller than that in the control group (12 vs. 19 per cent; $\underline{Z} = 1.21$). The lack of

statistical significance cannot be attributed to the sample size since there was a total of 156 students in the two groups; this number is sufficiently large to reveal significant differences, if they exist.

The analysis of another criterion, however, does reveal significant differences between the remedial and control groups. The mean grade of the control group was 1.85 (Table 2) while that of the remedial group in the regular course was 2.27 (Table 4). This difference which is somewhat less than half of a letter grade is statistically significant ($\underline{t}$ = 2.85).

In terms of satisfaction with the English course there were no significant differences between the remedial, regular, and control groups at College B. At College A, however, the remedials were significantly more satisfied with the remedial course than were the regular and control groups with the regular course.

What can be concluded from these results? It would appear that the fall remedial course at College B has a modest but a significant effect on subsequent accomplishment. Low ability students would do somewhat less well in the regular course if the remedial course were eliminated. It appears, however, that remedial students are as satisfied with the regular course as they are with the remedial course.

Effectiveness of Placement Procedures in English

In determining the effectiveness of the placement procedures in the English courses, the crucial comparison is between the percentages of students passing in the regular and control groups. At College A, 76 per cent regular versus 67 per cent control students passed while at College B, 85 per cent regular versus 73 per cent control students passed. The difference between the percentages is statistically significant only at College B.

Although the differences in percentage points at the two colleges are about the same, the number of cases at College A was not large enough for the difference to be significant.

It can be seen from Tables 1 and 2 that with most groups the percentage of students withdrawing is several times as great as the percentage failing. Instead of only predicting passes, failures, and grades, an important function of placement tests might be to predict withdrawals (which are not the same as failures). Students drop out of a course or from college for a variety of reasons, only one of which is their inability to do satisfactory work in the courses. The verbal ability of the dropouts, however, is in general not greatly different from the verbal ability of those who completed the course and passed. This finding, along with the Academic Motivation and Satisfaction scores shown in Table 2 would lead one to suspect that problems other than lack of ability, such as lack of motivation and dissatisfaction, exist with these students.

The withdrawal percentage in the control group at both colleges was greater than that of the regular group. At College A, withdrawals from the regular and control groups were 19 and 27 per cent, respectively, while the corresponding withdrawals at College B were 11 and 19 per cent. As with the difference in percentages passing, the difference in withdrawals was significant only at College B.

If failures in the regular groups and passes in the control groups are considered as misplacements, it cannot be concluded from the data obtained at either college that the present placement procedures result in correct placements above the chance level (χ^2 = .03 and 1.02 for Colleges A and B respectively). Most of the error in the placement system is attributable

to false negatives; i.e., students diagnosed as academically unprepared when in fact they can pass the regular course (admittedly, many of them obtain a grade of D in the regular course). This finding, along with those discussed in the previous paragraphs, leads one to conclude that the existing placement procedures would have to be greatly improved if they are to route only those who need remediation into remedial courses. The easiest way to eliminate potential misplacements is to eliminate the remedial course. If this is done, less than 8 per cent of the students would be misplaced (fail the regular course) and these students could take the regular course again and probably pass it.

Effectiveness of Remedial Course in Mathematics

As with English, one way in which the effectiveness of the remedial mathematics course at College B was evaluated is by determining whether it prepared students for the subsequent regular course in mathematics. Figure 2 indicates that of the 37 students who enrolled in the remedial course, 70 per cent or 26 students passed and 19 of these students later enrolled in the regular course.

Insert Figure 2 about here

Those who enrolled in the regular course after passing the remedial course had significantly higher Mathematics test scores than those in the control group (52.5 vs. 47.4; $\underline{t} = 2.86$). The comparison between the two groups is not completely appropriate because some of the lower ability students who passed the remedial course did not enroll in the regular course. Although 68 per cent of the remedials passed the regular course as compared

to 58 per cent of the control group, the difference is not statistically significant. Even if the difference was significant, however, it could be accounted for by the lower ability of the control students.

A comparison of the mean grades of the control and remedial groups in the regular course indicates the effectiveness of the remedial course. Among those who passed in the control group, the mean grade was 1.94 (Table 3) while that of the remedial group was 2.61 (Table 5). The mean grade difference is significant ($\underline{t}$ = 2.44) and is greater than that found in English. Part of this difference, however, may be attributable to the lower ability of the control students.

The remedial students (in the remedial course) were the most satisfied group as indicated by a mean score of 3.41. Less satisfied was the regular group with a mean of 1.35, while the least satisfied was the control group with a mean of -0.48. It is apparent that the control students found the course too difficult and were not satisfied with it. The remedial students, on the other hand, were quite satisfied with the remedial course, even to a greater extent than the more able students were satisfied with the regular course.

What can be concluded about the effectiveness of the remedial course in mathematics? While the results dealing with the percentages of students passing are somewhat inconclusive, the analyses of the other criteria favor the remedial course. The satisfaction scores of the remedial students placed experimentally in the regular group provide a reason against any recommendation to eliminate the remedial course. In addition to increasing student satisfaction, the remedial course improved the performance in the regular course by more than half of a letter grade.

Effectiveness of the Placement Procedures in Mathematics

The comparison between those passing in the control and regular groups indicates that the current placement procedures appear to be effective in placing students in remedial and regular courses. Only 58 per cent of the control group versus 78 per cent of the regular group passed the regular mathematics course. Among those who passed in the control group, the grade-point average was 1.9 while that of the regular group was 2.5. The relative number of withdrawals in the control group was greater, 29 versus 18 per cent.

While no conclusions can be drawn about the advanced course (because of the small number of cases), apparently the right students are being placed in the advanced course. All of the nine advanced students passed the course as opposed to only five of the nine in the appropriate control group.

Apparently the current placement procedures have some validity in placing students in remedial, regular, and advanced mathematics courses. The finding that most of the students identified for remediation can pass the regular course should be considered in the light of the results which indicate that the average grade of these students in the regular course is less than a C.

Conclusions and Recommendations

The evaluation of the effectiveness of remedial courses and placement procedures at two community colleges indicates the following:

1. One of the remedial English courses considered in this study had a modest but significant effect in raising the grades in the subsequent regular English course.

2. The remedial mathematics course which was evaluated appears to be more effective than the English remedial course. The course improved the performance of the students in the subsequent regular course by more than half a letter grade. In addition, the students were much more satisfied with it than with the regular course.
3. A fair evaluation of the placement procedures is difficult to make. Since the failure rate in the regular courses is very low, identifying those few who would fail is a formidable task for any placement system. The placement procedures are apparently more effective in assigning students to appropriate math courses than to appropriate English courses.

From the foregoing conclusions, the following recommendations are made:

1. The remedial English course at College B should be eliminated. For the few academically unprepared students who fail the course and consequently take it again, it will, in effect, be a remedial course the first time they take it. The placement problem would be eliminated because the misplacement of able students who could pass the regular course will not be possible.
2. The mathematics remedial course should be retained. Since the low ability mathematics students were quite dissatisfied with the regular mathematics course, there is no reason to believe that the course, like the regular English course, can act as a remedial course.

The results obtained in the study cannot safely be generalized to other colleges. Indeed, the results found at the two colleges are conflicting in

several instances. The effectiveness of a remedial course could depend to a great extent on the content, organization, or instructor teaching the course, and these aspects of remedial courses could have been atypical in this study.

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Footnotes

[1]The author is grateful to Dr. Robert F. Boldt for his assistance in designing and reviewing the results of the study.

[2]All statistical tests in this study were made at the .05 level.

Table 1

Predictor and Criterion Measures for Students at College A

Enrolled in English Courses without Prior Remediation

Group	N	%	Verbal	Interest	Motivation	GPA	Satisfaction
Exempted Remedial	6	100	31.50	15.80	---	---	0.67
Pass	2	33	35.00	16.00	---	2.000	---
Fail	2	33	30.00	18.50	---	0.000	1.00
Withdraw	2	33	29.50	10.00	---	---	---
Regular	86	100	52.48	15.65	43.72	---	4.68
Pass	65	76	52.22	16.32	44.82	2.538	4.60
Fail	5	6	57.20	13.20	45.33	0.000	4.50
Withdraw	16	19	52.06	13.69	39.60	---	5.75
Remedial	77	100	43.10	12.50	44.39	---	4.59
Pass	50	65	43.56	11.82	43.27	---	4.83
Fail	7	9	46.00	12.71	60.00	---	1.00
Withdraw	20	26	40.95	14.10	45.00	---	4.67
Control	45	100	46.02	13.91	47.59	---	2.52
Pass	30	67	46.87	12.66	50.27	2.033	2.22
Fail	3	7	36.33	13.00	60.00	0.000	6.00
Withdraw	12	27	46.33	17.17	39.20	---	3.67

Table 2

Predictor and Criterion Measures for Students at College B

Enrolled in English Courses without Prior Remediation

Group	N	%	Verbal	Interest	Motivation	GPA	Satisfaction
Exempted Remedial	21	100	38.43	9.14	45.00	---	3.94
Pass	15	71	38.00	9.67	45.00	2.067	4.73
Fail	2	10	42.00	8.50	---	0.000	-3.00
Withdraw	4	19	38.25	7.50	---	---	1.50
Regular	245	100	55.35	14.38	46.35	---	3.82
Pass	209	85	55.17	14.34	47.03	2.301	3.96
Fail	8	3	54.50	15.75	51.60	0.000	3.33
Withdraw	28	11	56.93	14.29	41.12	---	1.55
Remedial	130	100	47.64	10.57	47.18	---	3.80
Pass	108	83	47.88	10.31	47.97	2.204	3.84
Fail	16	12	45.81	13.13	46.25	0.000	3.40
Withdraw	6	5	48.17	8.50	39.67	---	2.00
Control	73	100	47.18	13.72	46.42	---	3.80
Pass	53	73	47.32	14.82	48.19	1.849	4.51
Fail	6	8	48.50	9.00	31.50	0.000	-1.50
Withdraw	14	19	46.07	11.71	46.67	---	1.60

Table 3

Predictor and Criterion Measures for Students at College B

Enrolled in Mathematics Courses without Prior Remediation

Group	N	%	Math	Interest	Motivation	GPA	Satisfaction
Exempted Remedial	23	100	46.95	11.39	39.00	---	-0.28
Pass	16	70	48.07	12.38	39.00	2.313	0.86
Fail	2	9	48.00	13.00	---	0.000	-7.00
Withdraw	5	22	43.20	7.60	---	---	-3.33
Remedial	37	100	50.06	11.36	48.89	---	3.41
Pass	26	70	52.00	12.40	53.09	2.615	4.50
Fail	3	8	48.50	4.33	41.50	0.000	6.00
Withdraw	8	22	43.29	10.75	42.60	---	-0.67
Control	31	100	47.43	9.45	46.83	---	-0.48
Pass	18	58	47.47	10.44	49.63	1.944	0.56
Fail	4	13	45.25	7.00	41.00	0.000	-2.00
Withdraw	9	29	48.33	8.56	41.50	---	-2.50
Regular	51	100	57.39	16.72	44.77	---	1.35
Pass	40	78	58.20	16.92	44.63	2.525	2.22
Fail	2	4	43.00	12.00	---	0.000	-4.50
Withdraw	9	18	57.00	16.89	45.17	---	-4.00
Control Advanced[a]	9	100	59.00	13.78	45.50	---	-1.29
Pass	5	56	57.80	14.60	45.50	1.600	-1.00
Fail	0	0	---	---	---	---	---
Withdraw	4	44	60.50	12.75	---	---	-2.00
Advanced	9	100	64.33	20.56	45.00	---	0.44
Pass	9	100	64.33	20.56	45.00	2.333	0.44
Fail	0	0	---	---	---	---	---
Withdraw	0	0	---	---	---	---	---

[a]The "control advanced" group consists of students selected randomly from the regular group to take the advanced mathematics course.

Table 4

Predictor and Criterion Measures for Students at College B Who Passed a Remedial English Course and Enrolled in the Regular Course

Group	N	%	Verbal	GPA
Exempted Remedial - Regular	11	100	38.09	---
Pass	9	82	39.78	1.778
Fail	1	9	38.00	0.000
Withdraw	1	9	34.00	---
Remedial - Regular	83	100	48.13	---
Pass	69	83	48.29	2.275
Fail	4	5	49.00	0.000
Withdraw	10	12	46.70	---

Table 5

Predictor and Criterion Measures for Students at College B Who Passed a Remedial Mathematics Course and Enrolled in the Regular Course

Group	N	%	Verbal	GPA
Exempted Remedial - Regular	11	100	46.45	---
Pass	6	55	48.33	2.500
Fail	0	0	---	---
Withdraw	5	45	44.20	---
Remedial - Regular	19	100	51.47	---
Pass	13	68	52.54	2.615
Fail	1	5	61.00	0.000
Withdraw	5	26	46.80	---

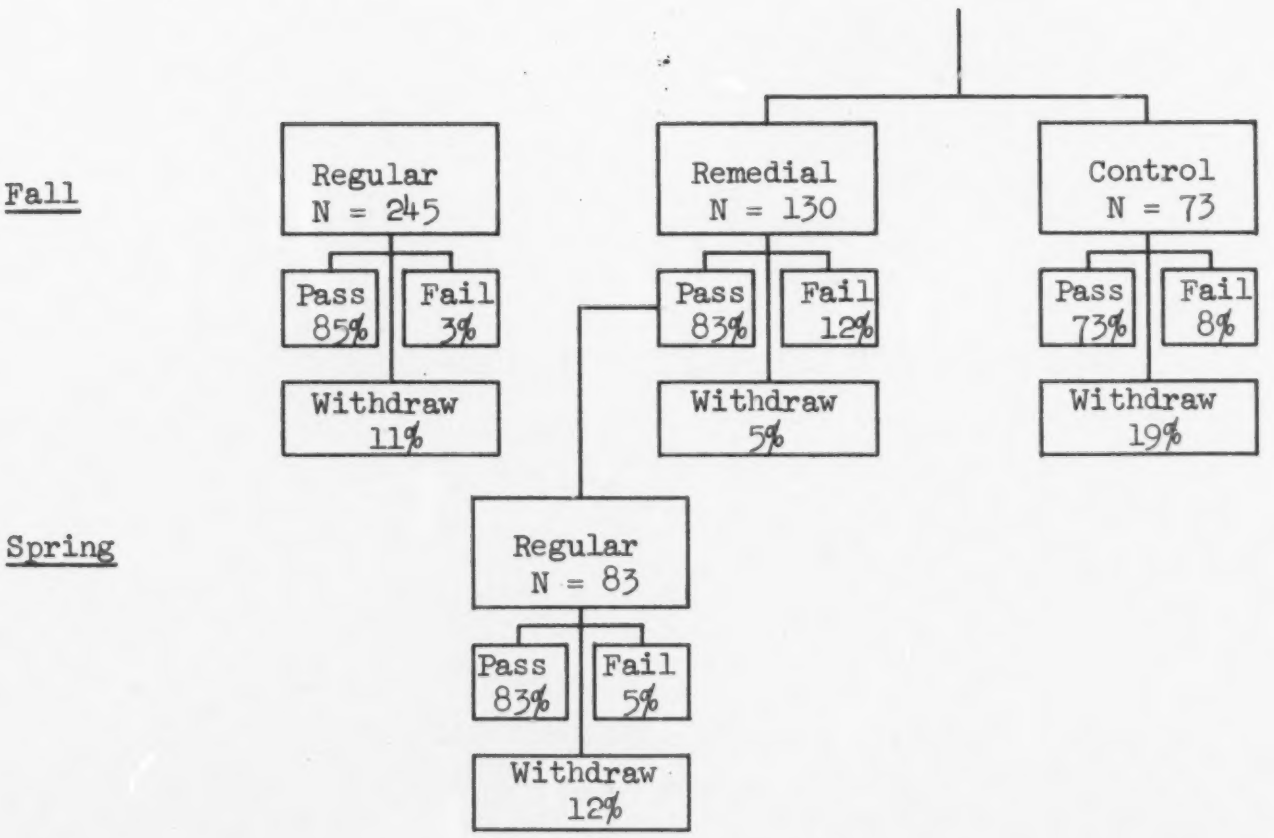

Fig. 1. Outcomes for three major study groups in English at College B.

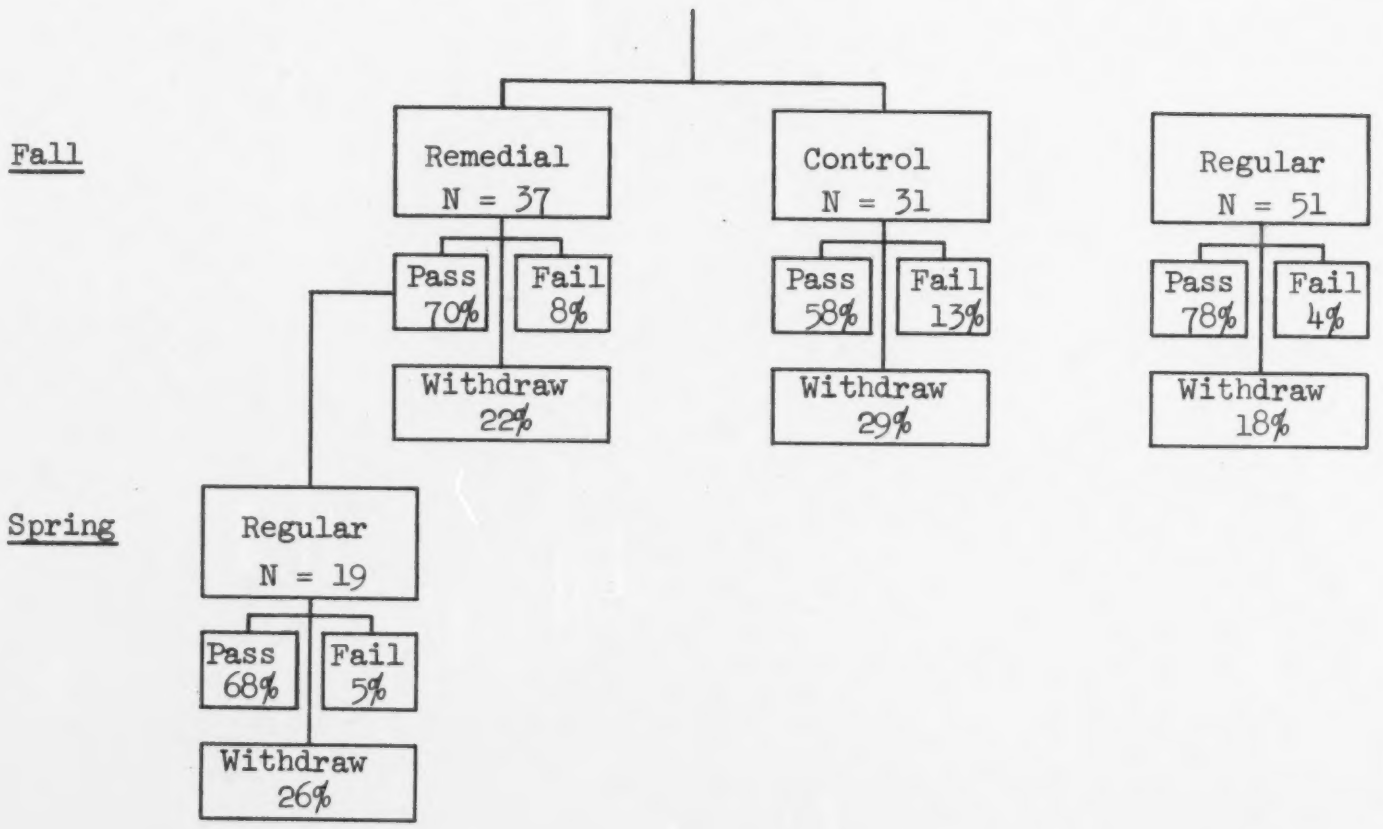

Fig. 2. Outcomes for three major study groups in mathematics at College B.